

# **AUDIT II**

## **Country Report**

### **POLAND**

Ryszard Wnuk/William Christensen  
Draft 01.11.2002



## **SUMMARY OF ENERGY AUDITING**

Polish energy policy has continuously evolved since the beginning of nineties, reflecting the transition of the country from centrally planned to market economy based. In order to improve energy efficiency, the following measures have been recommended by the Government:

- Upgrading product quality.
- Changing the structure of industry.
- Changing the structure of the national fuel and energy balance by optimising energy use for certain purposes (supply diversification enabling the choice of most efficient energy carrier).
- Using modern, energy-efficient devices and technologies, both in production and housing sectors, especially in households.

Environmental considerations have also played an increasing role in Poland since 1991. Poland has made major progress towards an environmentally more sustainable energy system, both in terms of a gradual substitution of coal to natural gas, and more stringent regulations concerning emissions from generating plants using fossil fuels. Efficient generation and utilisation of energy plays an important role in Poland's efforts to achieve its emissions reduction goals.

The Polish National Energy Conservation Agency (KAPE) is responsible for the operational implementation of the Polish energy efficiency and renewable energy policies. It supports the Department of Energy in the Polish Ministry of Economy. KAPE, which was established in 1994, is a non-profit joint stock company owned by the Ministry of Treasury, the National Fund For Environmental Protection and Water Management (owned by the Ministry of Environment), the National Economy Bank and the Industrial Development Agency. KAPE has a permanent staff of 20 persons.

### **Energy Audit Programmes**

There is no specific Energy Audit Programme in Poland. However, energy audits/energy monitoring are important elements of energy efficiency and related environmental protection programmes initiated by the government.

## **Programmes with Energy Audits**

### **The Thermo-Modernisation Programme and Fund**

The Thermo-Modernisation Programme and Fund, which have been in operation since 1999, provide technical and financial support for energy end-use improvements in residential buildings. Projects eligible for support include:

- End-use improvements in residential buildings.
- Reduction of energy losses in heat distribution networks.
- Substitution of conventional energy sources with non-conventional sources, including renewable energies.

The projects should fulfil:

- technical criteria (minimum energy savings in physical terms) and
- financial criteria: Standard Pay-Back Time (SPBT) equal to 10 years; the loan should not exceed 80% of the value of the project.

Investments in replacing conventional energy sources with non-conventional energy sources do not have to meet these requirements. Under the “Thermo-Modernisation Programme”, investors receive a premium of 25% of the loan used for implementing an eligible project upon its completion.

The applications have to be supported by an obligatory energy audit performed according to a set of guidelines provided through the scheme. Support from the Thermo modernisation Fund was made available for public buildings as from 1 January 2001. The state has reserved 85 millions PLN for 2002 and 110 millions PLN for 2003 for the scheme.

## **Other Activities including Energy Audits**

### **National Fund for Environmental Protection and Water Management (“NFOŚiGW”)**

The National Fund for Environmental Protection and Water Management was established in 1991 and is financed from environmental pollution charges and penalties. The Fund provides preferential loans up to 50% of the costs of environmental projects in a wide range of areas, including: water and sewage treatment, waste management, forest protection, atmospheric emissions, manufacture of environmentally sound products, flue gas treatment, waste management, etc. Projects must comply with a list of priority items, based on the document *National Environmental Policy*. Co-financing with the Provincial Funds for Environmental Protection and Water Management is possible.

In addition to the Fund, loans are also available from the Environmental Protection Bank, in which the Fund holds the majority of shares. Several credit lines for “pro-ecological” projects are available, among them credit lines for replacing street lighting in municipalities with energy efficient lighting systems and for implementing energy saving solutions in central heating and hot water supply systems.

## **EcoFund**

EcoFund was established in 1992 as an independent non-profit foundation aimed at managing the financial resources from so-called debt-for-environment swap, which was agreed between Poland and Western creditor countries (USA, Switzerland, France, Italy, Sweden and Norway). The statutes of EcoFund Foundation define five areas of projects:

- Limiting the greenhouse gas emissions and phasing out of substances depleting the ozone layer;
- Reducing the transboundary flow of SO<sub>2</sub> and NO<sub>x</sub>;
- Reducing the pollution of the Baltic Sea;
- Biodiversity conservation;
- Waste management.

Projects aiming at: energy conservation, promotion of renewable sources of energy, elimination of methane emissions and CFCs phase out are eligible within the first project area. Grants from the EcoFund are in general provided for investments. The equipment provided within these projects has to be provided from the countries contributing to the Fund. Grants are normally limited to 20-50 % of the project cost.

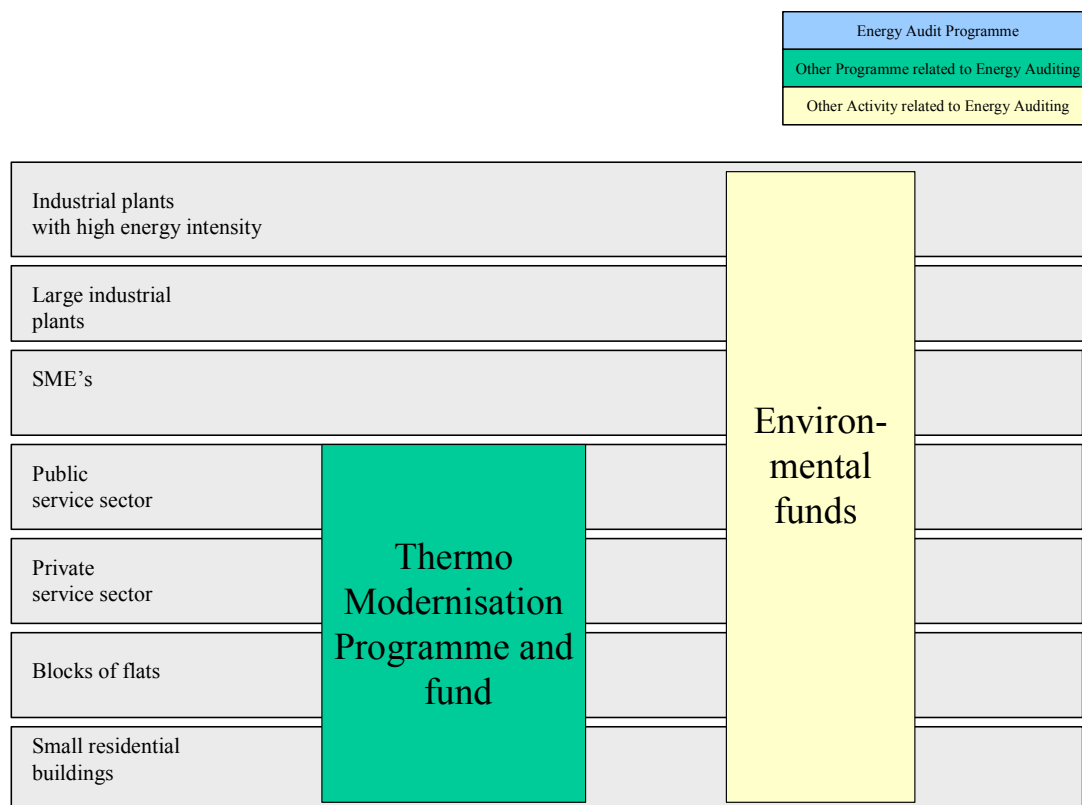


Figure 1: Map of energy audits in Poland

Table of EAP features coverage:

	Thermo-Modernisation programme and Fund
Status	Has been operating since 1999
Administration	Bank of National Economy (BGK)
EA models	++
Auditors' tools	++
Training, authorisation	+++
Quality control	++
Monitoring	+
Volumes, results	++
Evaluation	++

+++ = Detailed information available  
 ++ = Some information available  
 + = Very little information available  
 = No information available / does not exist

<i>General information</i>	KAPE Nowogrodzka Street 35/41 00-691 Warsaw	+48 22 6222797	<a href="http://www.kape.gov.pl">www.kape.gov.pl</a>
<i>Thermo-Modernisation Fund</i>	Bank of National Economy (BGK) Al. Jerozolimskie 7 00-955 Warsaw	+48 22 5229121 +48 22 5229177	<a href="http://www.bgk.com.pl">www.bgk.com.pl</a> <a href="mailto:bgk@bgk.com.pl">bgk@bgk.com.pl</a>
<i>EcoFund</i>	EkoFundusz Bracka Street 4 00-501 Warsaw	+48 22 6282354 +48 22 6289854 +48 22 6285082	<a href="http://www.ekofundusz.org.pl">www.ekofundusz.org.pl</a>

## Country Report

Country Report written by   Ryszard Wnuk   Polish National Energy Conservation Agency  
William Christensen   Institute for Energy Technology

## Disclaimer

The information contained in this report has been gathered from publicly available sources and through interviews. All efforts have been made to secure the veracity of the report, however the authors cannot guarantee the content.

## THE COUNTRY REPORT

### Table of Contents

<b>1. BACKGROUND AND PRESENT NATIONAL POLICY .....</b>	<b>8</b>
1.1. PRESENT NATIONAL POLICY AND ORGANISATION .....	8
1.2. ORGANISATIONAL STRUCTURE .....	8
1.3. ENERGY AUDITING HISTORY IN POLAND.....	9
<b>2. ENERGY AUDIT PROGRAMMES .....</b>	<b>10</b>
<b>3. PROGRAMMES WITH ENERGY AUDIT .....</b>	<b>10</b>
3.1. THERMO-MODERNISATION FUND AND ACT ON SUPPORT FOR THERMO-MODERNISATION INVESTMENT .....	10
3.1.1. <i>Background - Energy use and energy savings in buildings</i> .....	10
3.1.2. <i>Programme goals</i> .....	12
3.1.3. <i>Target sectors of the Thermo-Modernisation Fund</i> .....	13
3.1.4. <i>Administration</i> .....	13
3.1.5. <i>Implementing Instruments</i> .....	13
3.1.6. <i>Energy Audit Models</i> .....	13
3.1.7. <i>Training and authorisation of the auditors</i> .....	14
3.1.8. <i>Authorisation of energy auditors</i> .....	14
3.1.9. <i>Auditing volumes and results</i> .....	15
3.1.10. <i>Evaluation</i> .....	15
<b>4. OTHER ACTIVITIES INCLUDING ENERGY AUDITS .....</b>	<b>16</b>
4.1. ENVIRONMENTAL FUNDS .....	16
4.1.1. <i>EcoFund</i> .....	16
4.2. INTERNATIONAL CO-OPERATION – PROGRAMMES OF KAPE .....	18
4.2.1. <i>Energy Self-Audit Scheme</i> .....	18
4.2.2. <i>Programme “Master Plan for Energy Conservation in the Republic of Poland”</i>	19
4.2.3. <i>Energy Conservation Technological Centre (proposal)</i> .....	19

## **1. Background and Present National Policy**

### **1.1. Present national policy and organisation**

Poland has made progress in increasing its energy efficiency. Nevertheless, the GDP energy intensity is still 1.5 to 2.5 times higher than the average of the EU countries. The Polish energy sector is under a continuous change, undergoing restructuring and privatisation. The relevant state priorities are:

- European Union integration.
- Environmental concerns aimed mainly at reducing pollution of rivers and water reservoirs and decreasing air-polluting emissions.
- Decreasing the rate of unemployment.
- Fulfilment of international obligations.

During the last decade Poland made important progress in adapting the energy economy to market principles. On 10 April 1997, the Energy Act came into force. The purpose of the Act is, among others, to provide sustainable development of the country, energy security and efficient and rational use of fuels and energy. The Energy Act establishes the base for Third Party Access (TPA), Independent Power Producers (IPP), Renewable Energy Sources (RES), Low Cost Planning (LCP), Integrated Resource Planning (IRP), Energy Regulatory Authority (ERA), Demand Side Management (DSM) and Energy Efficiency Labels (EEL). One of the main targets stated in the Act is to achieve efficiency in the production, distribution and use of energy and fuels.

The Polish Government's energy policy is laid down in *the Assumptions for Poland's Energy Policy until the year 2020*, adopted by the Council of Ministers on 22<sup>nd</sup> February 2000. The *Assumptions* formulated the strategic directions of the state activities, from which one is the strategy of improved energy efficiency. The central element of this strategy includes promotion of modern, highly efficient machines and equipment capable of competing both on the national and foreign markets. The energy efficiency and renewable energy policy consists of:

- Improvement of fuel consumption effectiveness i.e. cogeneration promotion.
- Increased efficiency of the heat and electric energy consumption.
- Promotion of non-conventional and renewable energy sources.

The Government's strategy to promote energy efficiency concentrates on three types of instruments: direct regulations (standards), market stimulation (economic and fiscal), and supporting instruments (information, education, R & D).

### **1.2. Organisational structure**

The Polish National Energy Conservation (KAPE) is responsible for the operational implementation of the Polish energy efficiency and renewable energy policies. KAPE supports the Department of Energy at the Polish Ministry of Economy and was established by the Polish Government in 1994 with an initial capital of 1 million US\$. KAPE is a joint stock company owned by the Ministry of Treasury, the National Fund For Environmental Protection and Water Management (owned by the Ministry of Environment), the National Economy Bank and the Industrial Development Agency. It



has a permanent staff of 20 persons and is a non-profit national organisation, linking governmental and non-governmental organisations with regulatory bodies, the energy distribution sector and end-users. The strategic aim of KAPE is to develop and promote governmental, regional, local and individual initiatives on energy efficiency and renewable energy sources utilisation.

KAPEs experience, including present activity, concerns mainly the following areas:

- energy policy and planning on local and regional levels;
- housing and sustainable built environment,
- thermorenovation of buildings and its heat systems,
- energy from renewable resources;
- district heating;
- energy efficiency in industry.

There are also other actors in the field of energy efficiency, i.e.:

- The National Energy Conservation Agency (NAPE), which was created in 1992 by the Polish Development Bank. NAPE acts exclusively on a commercial basis on the following areas: audits for buildings and industry, energy plans for enterprises, studies and contribution to the development of specific legislation. It organises courses for energy auditors. These courses are supervised by KAPE.
- The Foundation for Energy effective Utilisation (FEWE) – created in 1990 by three private persons, was supported by US funds. It carries out projects on energy efficiency labelling and on the promotion of energy efficiency equipment, it has also organised training programmes.
- Regional Energy Conservation Agencies.

At the local level, municipalities are encouraged to build necessary capacity to develop and implement the energy efficiency/rationalisation plans required by the Energy Act.

### **1.3. Energy auditing history in Poland**

Energy auditing in Poland became very important at the beginning of 1990-ies due to the changes in national economy and the increase of energy prices. Energy auditing has been particularly important in the building sector. Presently, professional energy auditing services are delivered by many institutions as well as by individual experts (energy auditors). The National Energy Conservation Agency (NAPE) and the National Research and Development Centre for Energy Management (OBRGE) are examples of organisations working in the field.

Industrial energy surveys have been developed in Poland since 1964 as a part of the national energy conservation programme. The core activity of OBRGE, which was established in 1964, has always been to undertake energy surveys (part of energy audit) for industrial enterprises focusing on both the processes and the buildings. OBRGE also undertakes tests of water preparation stations. The aim of the surveys delivered by OBRGE is to provide industry with professional services to indicate opportunities for energy efficiency improvement.

A network of regional agencies (RAPE) was established in Poland during the years 1995 to 1998. Usually, the local (provincial) authorities founded the agencies as joint stock companies, involving local energy utilities as shareholders. The purpose of establishing the agencies was to support local governments in their energy efficiency efforts. The RAPEs co-operate with KAPE on the basis of

common national and international projects and activities. For example, KAPE and the regional agencies co-operated closely in the SCORE (*Supporting Co-operative Rational Energy-use*) programme, which ran between 1996 and 2002 and was supported by the government of the Netherlands and co-ordinated by NOVEM. At the moment regional energy conservation agencies are performing consultancy activities covering energy auditing in order to attract investments to favourable projects.

### **Energy audit system**

The Polish National Energy Conservation Agency (KAPE) has established an energy audit system in the country. KAPE has formulated requirements and a test providing experts with the opportunity to gain a specialisation in energy auditing. The experts must prepare at least one energy audit of a building and will be subject to an examination by committee set up by KAPE. A positive result of the test will entitle experts to be registered on the list of authorised energy auditors. The list of energy auditors is accessible on the Internet page: [www.kape.gov.pl](http://www.kape.gov.pl). By August 2002 there are 140 persons registered as energy auditors commissioned to perform energy auditing in buildings.

## **2. Energy Audit Programmes**

There is no stand-alone Energy Audit Programme. However, energy audits are important elements in some other programmes, including environmental protection programmes.

## **3. Programmes with Energy Audit**

### **3.1. Thermo-Modernisation Fund and Act on Support for Thermo-modernisation Investment**

Undertaking of Energy Audits is one of the central elements of the Thermo-Modernisation Programme and Fund.

#### **3.1.1. Background - Energy use and energy savings in buildings**

In Poland the so called housing sector consumes about 42% of the total primary energy used for heating and domestic hot water preparation, of which approximately 35% is used by residential dwellings and the remaining 7% by public utility buildings and those accommodating retail outlets and services. It is generally assumed that consumption may be reduced by about 40%.

The requirements for heat protection have gradually become stricter over the years, but by present day standards the existing level of energy consumption for heating buildings is still too high. And the main reasons for this are:

- Insufficient insulation of walls and roofs as well as windows and doors.
- The shape of buildings and their location are often unfavourable with regard to heat losses. Previously, these problems have not received due attention in the building design and construction process.
- On average, the energy efficiency of the heat sources is very low. This particularly pertains to individual heat sources, but also community boiler rooms using out-dated boilers.
- Considerable energy losses in the pipe network and installations.

- In a majority of cases installations lack automatic management and control equipment.
- Due to lack of heat meters and radiator controls, the users neither have the possibility nor the motivation to save energy.

Between 1994 and January 1997, the Ministry of Spatial Planning and Construction ran a scheme aimed at “elimination of technological defects in panel buildings”. Within this scheme thermo-renovation of external walls<sup>1</sup> was made in 773 000 housing units<sup>2</sup>. However, a technical evaluation of the scheme in 1996/1997 showed that the quality of the refurbishment work was poor<sup>3</sup> and that the energy efficiency improvement was negligible. At the same time it was clear that it was still necessary to undertake thermo-renovation in 989 700 additional housing units, i.e. 31,0% of the total building stock owned by co-operatives.

Thus, KAPE took the initiative to establish a new thermo-modernisation scheme, which could be offered to all kind of building owners (not just co-operatives) and which should address local heat sources and be based on best available local and foreign technical experience.

### **The Thermo-modernisation Act**

The *Act on Support for Thermo-Modernisation Investment* was approved by the Polish Parliament and came into power on 28 December 1998, establishing at the same time the *Thermo-Modernisation Fund*. It is assumed that the scheme for thermo-modernisation of buildings will run approximately 10 years. According to the *Act on the Support for Thermo-Modernisation Investment* eligible projects have to satisfy the following purposes:

- a) Reduction of the consumption of energy supplied for purposes of heating and domestic hot water to residential houses and houses used by municipal entities for purposes of public service.
- b) Reduction of energy losses in local distribution networks and use of local heat sources, with maximum capacity 11.6 MW thermal power. Support to such projects can only be made if measures to reduce the consumption of energy in the connected buildings, as mentioned in paragraph a) above, have been undertaken.
- c) Total or partial replacement of conventional energy sources with non-conventional ones, including renewable energy sources.

Furthermore, the Act also defines conditions that have to be satisfied and the extent to which financing can be granted for certain projects. These are as follows:

- a) Projects have to lead to a reduction of the annual energy consumption for purposes as provided for in the Act.
- b) In buildings with modernised heating systems, improvements have to reach at least 10 per cent.
- c) In other buildings - at least 25 per cent.
- d) Improvements that result in reduction of annual losses of primary energy using local heat source and in local distribution network - at least 25 per cent;
- e) Installation of technical couplings to connect to centralised heat source and close the local heat source aimed at reduction of costs of purchase of heat supplied to buildings - by at least 20 per cent per annum;

---

<sup>1</sup> Mostly pre-fabricated multi-layer walls

<sup>2</sup> Approximately 10% of total housing stock in towns

<sup>3</sup> Maximum 5 cm of additional insulation

f) Replacement of conventional energy sources with non-conventional ones.

If, the investment falls under the Fund's criteria, an energy audit is required to support and underpin the technical and economic evaluation. The Act through its appendices provides a thorough description of what the energy audit should cover and what formulas should be used. In particular an energy audit report shall contain:

- a) ID of the building, including description of the local heat source, local heat distribution network and its proprietor.
- b) An appraisal of the technical condition of the building, local heat source and local heat distribution network.
- c) A description of possible options of thermo-modernization measures.
- d) An identification of an optimal mix of thermo-modernization measures.

The Fund is a financial instrument supporting the Thermo-modernisation Act and offers a thermo-modernisation premium to investors who implement projects in accordance with the Act. A projection of the state budget spending on the thermo-modernisation programme over the next five years is presented in Table 3.1:

<i>Year</i>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
<i>Allocated state Budget</i>	5,0	30,0	60,0	85,0	110,0

Table 3.1. State budget reserves for thermo-modernisation premiums, million PLN (1 Euro  $\approx$  4,2 PLN)

The thermo-modernisation premium can be granted to investors who are completing thermo-modernisation projects, if the following conditions are fulfilled:

- a) the credit granted for completion of a thermo-modernisation project does not exceed 80 per cent of its costs and repayment period does not exceed 10 years;
- b) monthly instalments of the capital and interests repayment are not lower than the capital instalment increased by the accrued interests and are not higher than calculated on the basis of the verified energy audit, equivalent to 1/12 of the amount of the annual energy saving costs as obtained in result of the thermo-modernisation project completion. Acting on demand of the investor, the crediting bank can determine higher repayment rates.

25 per cent of the credit is given as a grant to the investor after the thermo-modernisation project has been completed. The first thermo-modernisation contracts were signed in July 1999.

### 3.1.2. Programme goals

The main objective of the thermo-modernisation programme is to increase the energy efficiency of the present building stock and the local heat distribution networks, thereby decreasing the running costs and improving the living standard.

The effects of individual thermo-modernisation projects are different in each case. However, based on some data from projects already undertaken, the following average values have been determined, see table 3.2.

<i>Item no.</i>	<i>Method of obtaining savings</i>	<i>Decrease in heat consumption as compared to before thermo-modernisation</i>
1.	Installation of weather compensation and control systems at the district heating sub station	5-15%
2.	Air-tight installation and insulation of piping, hydraulic realignment of the pipe system and retrofitting of radiators in all rooms with thermostatic valves	10-20 %
3.	Retrofitting of heat allocator	Approx.10%
4.	Radiators reflectors	Approx.2-5%
5.	Improvement or replacement of windows and external doors	3-5%
6.	Fitting triple glazed windows with special glass	10-15%
7.	Insulation of the external construction partitions (walls, roof, attic ceiling)	10-25%

Table 3.2. Average values for the energy savings in multifamily buildings (KAPE, 1998)

### 3.1.3. Target sectors of the Thermo-Modernisation Fund

The Fund is available to all investors, as proprietors or administrators of buildings including public budget entities and budget services, administrators of local heat sources or local heat distribution networks investing in thermo-modernisation projects.

### 3.1.4. Administration

The Bank of National Economy (BGK) administers the fund. The BGK designated four companies (including KAPE) to verify the energy audits. The agreements between the BGK and these companies have been signed. The companies dealing with energy audits verification could not be engaged in energy audits preparation.

### 3.1.5. Implementing Instruments

#### *Financing/subsidies*

There are no direct subsidies for energy audits; however, they are required in order to obtain financial support for investments from the Thermo-modernisation fund.

### 3.1.6. Energy Audit Models

The methodology for energy audits is legally regulated in Poland. The Ministry of Internal Affairs and Administration on 30 April 1999 (MI&A, 1999) issued a proper law<sup>4</sup> (amended in 2001). The

<sup>4</sup> The Ordinance (in Polish) is available in internet: <http://www.abc.com.pl/serwis/du/1999/0459.htm> or <http://www.nape.pl>

ordinance contains 3 Annexes referring to energy audits for three categories of objects: buildings, heat sources and heat networks. The auditing methodology for each category includes technical and economic issues.

### 3.1.7. Training and authorisation of the auditors

In 1995, in co-operation with DTI and COWI from Denmark (grant of Danish Energy Agency) countrywide training for building energy auditors was initiated by KAPE. First, a group of 12 energy experts was selected and trained in Denmark. The training resulted in preparation of a training manual in the Polish language. Furthermore, an energy consultancy secretariat was established at KAPE. During the years 1995 to 1999, about 2700 architects, HVAC and civil engineers successfully completed training courses run by different energy efficiency organisations in accordance with KAPE's requirements and programme, see fig. 3.3. The implementation of the thermo-modernisation programme for buildings therefore had the benefit of a sufficient number of qualified energy experts.

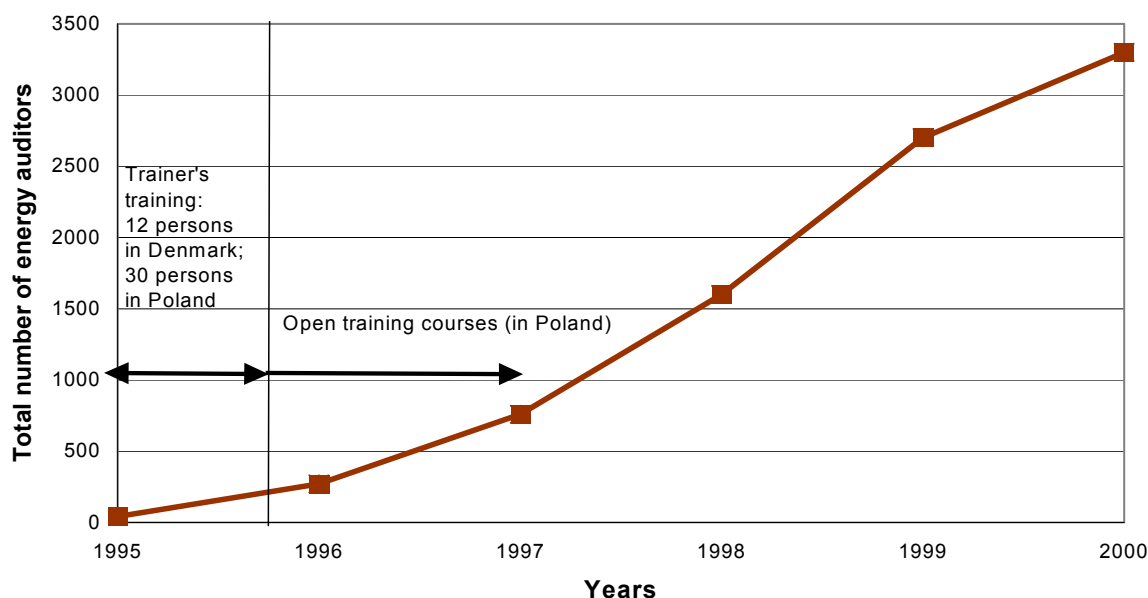


Figure: 3.3 Increasing numbers of energy auditors specialising in buildings

The Secretariat at KAPE registers all energy consultants who have completed the energy auditing training courses, issues certificates and authorises consultants. All energy consultants who have completed the training course can be found on KAPE's Web site: <http://www.kape.gov.pl>. Generally the Thermo-Modernisation Act does not require that authorised auditors should perform the energy audits. It is up to the investor to decide which energy auditor he wants to use. However, all energy audits have to be verified by a company approved by the BGK.

### 3.1.8. Authorisation of energy auditors

- Personal requirements
  - Higher Technical Education (architecture, building engineering, power engineering, environmental protection engineering, HVAC, etc.
  - Minimum 3 years practice in profession.

- Preparation of a complete energy audit in conformity with KAPE's standard (now ordinances to the Thermo-modernisation Act).
- Presentation of the audit and examination by the authorised commission.

However, auditors need not be authorised to undertake an audit, which should be used to apply for funding from the Thermo-modernisation programme.

### 3.1.9. Auditing volumes and results

Type of investment	Total number	Percentage of savings (average waged)*	Energy savings per year [PLN]	Credit [PLN]	Own means [PLN]	Cost of investment [PLN]
Single family buildings	220	62,39	1.652.321,60	6.497.606,64	4.011.098,32	10.508.704,96
Multi-family buildings	327	33,89	9.934.668,47	39.588.770,22	22.388.931,78	61.977.702,00
Local heat sources	31	42,70	2.697.623,20	6.367.025,86	4.815.985,14	11.183.011,00
Heating network	8	61,55	243.027,90	813.479,00	677.354,00	1.490.833,00
Others heat sources	2	32,82	358.807,00	381.000,00	235.597,00	616.597,00
Public service buildings	24	65,99	2.565.153,50	7.810.342,80	6.971.796,30	14.782.139,10
Buildings of pensions etc.	2	66,49	35.929,00	86.120,00	86.975,00	173.095,00
Total	614	40,01	17.487.530,67	61.544.344,52	39.187.737,54	100.732.082,06

\* Percentage of savings (weighted average)

Table 3.4: Expected savings and costs of different type of investments from energy audits in the time-period from 1 January 1999 to 31 August 2002 (data obtained from BGK)

### 3.1.10. Evaluation

On 2 April 2002, the Council of Ministries approved an evaluation of the *Assumptions' for Poland's Energy Policy until the year 2020*. The evaluation also contained a number of proposed corrections. The evaluation concluded that the targets of the policy, as described in the *Assumptions* document, have not been achieved. With regard to the thermo-modernisation Act, the main conclusions are as follows:

- The thermo-modernisation programme did not fulfil expectations due to complicated and expensive system concerning the energy audits.

This observation resulted in an amendment of the Act, which was introduced in 2001. The amendment simplifies the economic part of the energy audit, limiting calculations to Standard Payback Time (SPBT).

## **4. Other Activities including Energy Audits**

### **4.1. Environmental Funds**

#### **4.1.1. EcoFund**

EcoFund was established in 1992 as an independent non-profit foundation aimed at managing the financial resources from so-called debt-for-environment swap, which was agreed between Poland and Western creditor countries (USA, Switzerland, France, Italy, Sweden and Norway).

There is no formal obligation for applications to be supported by energy audits. Applications for support to projects in the energy sector (production, distribution or utilisation) should include an energy audit, but EcoFund does not require this energy audit to be in a special format. If the application concerns projects that also seek funding from the thermo-modernisation programme, the EcoFund requires the energy audits to be in accordance with the standards of the thermo-modernisation Act.

#### **Programme priorities**

The statutory objective of the EcoFund is to support, by way of grants, particularly important activities in the field of environmental protection in Poland. The proposed projects should be consistent with the "National Environmental Policy" as adopted by the Polish Parliament in 1991, and should contribute to fulfilling Poland's obligations arising from international conventions and agreements.

Projects should fit into the four areas ("sectors") defined in the Statutes of the Foundation and considered to be of high priority internationally:

1. Limiting the greenhouse gases emissions and phasing out the substances depleting the ozone layer.
2. Reducing the trans-boundary flow of sulphur dioxide and of nitrogen oxides.
3. Reducing the pollution of the Baltic Sea.
4. Biodiversity conservation.

In the area of reducing emissions of greenhouse gases the EcoFund may support projects aimed at:

- energy saving;
- promotion of renewable sources of energy.
- elimination of methane emissions;
- CFCs phase-out from industrial processes.

Priority is granted to those projects, which represent best value-for-money in terms of delivering environmental benefits at least cost and fulfilling at least one of the following specific conditions:

- Provide for promotion on the Polish market of innovative environmental technologies from the countries that contribute to the EcoFund (demonstration and pilot projects).
- Are of high importance to human health and/or to the society's environmental education.

#### **Project financing criteria and conditions**

The EcoFund may provide financial support to investment projects (construction of installations or devices designed for the benefit of environmental protection), but does not offer such resources for



research or monitoring of environmental contamination. The possibility of receiving financial support for "non-investment" projects may only apply to projects in the biodiversity protection area. The EcoFund may only provide financial support to the "investment stage" of investment projects (except the nature protection area), which means that pre-investment studies are not eligible for assistance.

The proposals presented should be backed up with both a feasibility study and a financial plan. In case of projects, which have both environmental and commercial objectives, the application, shall be assessed by the EcoFund under the condition of the applicant presenting a "business plan" encompassing the entire project as well as a detailed justification for the necessity of receiving non-commercial resources for the implementation of the project's environmental component.

EcoFund will provide financial support only in the form of non-repayable grants, which basically encompass 10-30 per cent of a total project cost. Any applicant wishing to receive an EcoFund grant has to provide equity capital funding for the project and present a credible financing plan for the total project. The EcoFund can support both new and continued investments.

### **5.2.2 National Fund for Environmental Protection and Water Management**

The National Fund for Environmental Protection and Water Management was established on the basis of an amended Act concerning the protection of nature. The fund was created on 27 April 1989 and began operating on 1 July the same year.

The National Fund's objectives and scope of activities are defined by the following acts:

- a) The Protection and Shaping of the Environment Act;
- b) The Water Act;
- c) The Geological and Mining Act.

The main objective of the National Fund is funding projects, which serve the protection of the environment. These projects have been described in the "National Environmental Policy" adopted by the Polish Parliament in 1991 and specified in the "Implementation Programme for the National Environmental Policy by the year 2000.

The Fund provides preferential loans up to 50% of the costs of environmental projects in a wide range of areas, including: water and sewage treatment, waste management, forest protection, atmospheric emissions, manufacture of environmentally sound products, flue gas treatment, waste management, etc. Project must be included in a list of priority projects, based on the document *National Environmental Policy*. Co-financing with the Provincial Funds for Environmental Protection and Water Management is possible.

In addition to the Fund, loans are also available from the Environmental Protection Bank, in which the Fund holds the majority of shares. Several credit lines for "pro-ecological" projects are available, among them credit lines for replacing street lighting in municipalities by energy efficient lighting systems and for implementing energy saving solutions in central heating and hot water supply systems.

## 4.2. International co-operation – programmes of KAPE

KAPE has participated in EU programmes comprising or dealing directly with energy audits, i.e.:

- *Energy self – audit scheme*
- *Framework Innovations for Building Renovation (Frames)*
- *Technical and economic assessment of possible improvements of energy efficiency on residential building /heating system in Poland*
- *Third Party Financing of energy efficiency investment in industry. Structuring of pilot projects in Poland, Austria, Norway and Spain*
- *Tools for Thermal Refurbishment for CEE and EU Countries*
- *TPF Expert System to Support Energy Efficiency in Buildings*

### 4.2.1. Energy Self-Audit Scheme

The *Energy Self-Audit Scheme* will be implemented in the period between 1 January 2000 – and 31 December 2002.

The primary objective of the project is to develop a scheme and necessary tools, which would encourage industrial companies to undertake well co-ordinated and comprehensive actions aiming at improvements in energy efficiency and a reduction of emissions to the environment. The overall goal of the project is to convince managers of the advantages and benefits of the energy self-audit and Long Term Agreements (LTA) approach. The main activity of the project is preparing and implementing pilot projects in selected factories and presenting them as successful examples, which can then be copied and implemented by other companies.

The principal elements of the approach proposed to the companies are:

- (i) To carry out an inventory of the energy processes.
- (ii) To start collecting energy data.
- (iii) To implement an energy management system.
- (iv) To carry out an energy self-audit.
- (v) To elaborate and implement an energy efficiency strategy.
- (vi) To reduce energy consumption and emissions of carbon dioxide, the main contributor to global warming.
- (vii) To generate commitment to energy efficiency.

Furthermore, the reported action is expected to result in drawing up the methodology, auxiliary information and training materials for industrial energy managers, which will allow them to introduce comprehensive long-term programmes aiming at improvements in energy efficiency.

The additional assumption was that by implementing the pilot projects and subsequent dissemination activities, it would be possible to support a process of rationalising energy use in industry.

In order to teach the objectives of the project the following phases were implemented: awareness rising; know-how transfer; registration of factories willing to join the scheme; self-audit; internal statements; public report; dissemination; implementation of the measures (beyond the project scope).

The main achievements of the project are:

- Significant increase of awareness regarding energy efficiency, monitoring and targeting, planning of investments among the factories' managers and technical workers at the factories.
- Identification of no and low-cost undertakings in factories.
- Starting energy monitoring.
- Real reduction of energy consumption and emissions of environmental pollutants at the factories participating in the project.
- Confirmation that a self-audit scheme can be a useful tool also in Polish realities.

The most important effect of the project was identification of the projects to be implemented in the future and drawing up an activity plan concerning energy efficiency. 18 companies have performed this works successfully. The results are presented in the table 7.

#### **4.2.2. Programme “Master Plan for Energy Conservation in the Republic of Poland”**

A number of energy audits have been undertaken in industrial facilities in Poland in the framework of the *Master Plan Study for Energy Conservation in the Republic of Poland* and these show a large potential for energy efficiency. The *Master Plan* was a wide study targeted at the industrial sector of the Polish economy. A Japanese Study Team undertook the study in co-operation with KAPE and Polish university experts.

##### **Results of the audits**

Simple audits (3 days) were undertaken in twelve factories and detailed audits (7 days) were undertaken in five factories. The data obtained through the audits enabled the Team to understand the actual energy use situation in each factory and to estimate the energy efficiency potential.

A big potential in electric energy savings were found in two factories. They concerned improvement of compressed air systems maintenance. Proper management of compressed air systems or simple measures like cutting off unnecessary air flows (by closing relevant valves) would bring 170 thousand US dollars and 17 thousand US dollars per year in savings on the electricity bill in these two factories, respectively.

The results of the energy audits at each factory were conveyed to the management of the factories and in many of the factories the simple measures were undertaken immediately. It was concluded that improvement of energy management and improvement of equipment and devices with a payback period up to 3 years can lead to increased energy efficiency in the range of 13 to 28%.

#### **4.2.3. Energy Conservation Technological Centre (proposal)**

In the *Master Plan* final report it was recommended that an Energy Conservation Technological Centre (ECTC) be set-up by the Polish government. The purpose of the ECTC is to provide a regular structure, which could train factory executives, energy managers and energy consultants in energy efficiency issues.

ECTC will provide a forum for exchange of experience and information within the Polish industry allowing access to best available energy efficiency technologies and equipment.

Table 7. Activity plan concerning energy efficiency in particular factories

<i>Factory's name</i>	<i>Energy Performance Index (EPI)</i>		<i>Types of projects to be implemented in the future</i>										
	<i>2000 (base)</i>	<i>2001 (plans)</i>	<i>Energy auditing</i>	<i>Energy monitoring</i>	<i>Appointing responsible person</i>	<i>Space heating</i>	<i>technology (heat)</i>	<i>Boiler stations</i>	<i>Cooling</i>	<i>Electric drives</i>	<i>CHP</i>	<i>Lighting</i>	<i>Compressed air</i>
CEMET Ltd, Gdańsk	1.0	0.9	+	+	+	+		+		+		+	+
CERMAG s.c., Opalenie	1.0	0.7	+	+	+	+	+	+		+		+	
Delphi Mechanics Systems, Gdańsk	1.0	1.0	+		+						+	+	
Marine Metal sp. z o.o., Gdańsk	1.0	0.96	+	+	+	+	+	+		+		+	+
OLVIT Sp. Z o.o., Gdańsk	1.0	0.95	+	+	+	+	+	+	+	+			
POLMOS SA, Tczew	1.0	0.8	+	+			+	+	+	+			
FORNITEX Sp. Z o.o., Wejherowo	1.0	0.92	+	+	+	+	+	+		+		+	+
SeCeS-POL sp. z o.o., Gdańsk	1.0	0.9	+	+	+	+		+		+		+	+
Radpol S.A.. Człuchów	1.0	0.99	+	+	+	+		+		+			+
ZPP Czarna Woda S.A.	1.0	0.81		+			+	+			+		
Cukrownia „Łapy” S.A.	1.0	0.97	+		+	+		+		+	+	+	+
ZPM „Mlecz” Sp. z o.o., Wolsztyn	1.0	1.0	+	+	+	+	+	+		+		+	
Proszkownia Mleka w Piotrkowie Kujawskim Sp. z o.o.	1.0	1.0											
Toruńska Spółdzielnia Mleczarska	1.0	0.95		+	+	+	+	+	+	+		+	+
OCEANIC, Sopot	1.0	0.97	+		+	+	+	+	+	+		+	+
NAUTA, Gdynia	1.0	0.89			+			+	+			+	+
KLIMAWENT, Gdynia	1.0	0.94	+	+	+	+				+		+	+
„Elektrim-Kable” S.A., Szczecin	1.0	0.89	+		+	+		+		+			
SIGMATEX S.A., Piotrków Trybunalski													
Cukrownia „Sokołów” S.A.	1.0	0.95	+		+	+		+		+	+	+	+

ECTC should take a dominating position on the Polish energy efficiency scene during 3 to 4 years through creating a network of energy professionals assisting industry, offering energy efficiency services, transfer of know-how and information on modern technologies and equipment.

The target group should initially be small & medium sized enterprises (SME). There are about 7200 SME on the Polish manufacturer's market (Annual Statistical Book, 1998). It is assumed that 1200 to 1500 executives and 3000 to 3500 heat, electricity and process engineers could be trained and ready for energy efficiency undertakings in the industry.

The ECTC strategy focuses on developing a strong organizational structure for uniform energy auditing training, creating a nation-wide energy consultant network and energy clubs for factories. ECTC will offer high quality training services at moderate prices in order to ensure that a significant number of executives, factory energy managers and energy consultants participate in the training and become members of the network. Training programs will deal with energy auditing methodology and procedures. ECTC is not going to offer activities, which would compete with already running training courses, mostly at technical universities. ECTC will to the extent possible use Polish human resources and experience in their work.

The ECTC will also provide investment services, such as legal and insurance advice, assistance in preparing financial applications to available funds, etc. These activities will be an additional source of financing for the ECTC and help run the other activities.

The proposal for establishing an ECTC is presently under consideration by the Polish government.

## 5. References

### Reference material

- BALTIC ENERGY EFFICIENCY GROUP-Energy Efficiency in Industry – Case Study – Poland, 1999.
- Chojnowski J.: Ocena przedsięwzięć zmniejszających zużycie energii w świetle ustawy termomodernizacyjnej i rozporządzeń wykonawczych. Lublin, Rynek Energii 3(22)/1999, ss. 10-13.
- Chojnowski J.: Opłacalność termomodernizacji. Rynek Energii 1(26)/2000, ss. 21-27.
- Chojnowski J.: Opłacalność kredytów termomodernizacyjnych. V Konferencja Naukowo-Techniczna „Rynek Energii Ciepłej”, Nałęczów, 18-20 listopada 1999. KaprInt, Lublin, Materiały Konferencyjne 1999, ss. 23-28.
- Dworzyńska-Opatczyk, Górzyński J. : Wybrane fragmenty audytu budynku mieszkalnego. Gospodarka Paliwami i Energią Nr 11/1999, ss. 25-28.
- Górzyński J.: Ocena opłacalności modernizacji budynku przy finansowym wspieraniu jej realizacji zgodnie z ustawą termomodernizacyjną. Gospodarka Paliwami i Energią Nr 10/1999, ss. 24-27.
- Ile na docieplanie. Energia 1/2000, s. 43.
- Jędrzejewska-Ścibak T., Sowa J., Zdrowe powietrze w domu, MURATOR Radzi, 1/2000 Warszawa (2000).
- Kredyty na docieplanie. Gazeta Prawna 20.01.2000.

- Ocena ekonomiczna przedsięwzięć w zakresie poprawy efektywności energetycznej. Warszawa, Polskie Sieci Elektroenergetyczne S.A. Fakty, dokumenty Nr IV/1996, ss. 1-40.
- Praca zbiorowa pod redakcją M. Żukowskiego, Jak zmniejszyć koszty ogrzewania, Poradnik dla właścicieli domów jednorodzinnych. Wydawnictwa Krajowej Agencji Poszanowania Energii S.A., Warszawa (1999).
- Recknagel, Sprenger, Honmann, Schramek, Ogrzewanie i Klimatyzacja, Poradnik. EWFE (1994/1995).
- Robakiewicz M.: Uwagi w sprawie audytów energetycznych opracowanych na podstawie Rozporządzenia MSWiA z 30.04.1999 r. Biuletyn Poszanowania Energii. Gospodarka Paliwami i Energią Nr 9/1999, ss. 15-18.
- Rozporządzenie Ministra Gospodarki Przestrzennej i Budownictwa z dnia 14 grudnia 1994 r. w sprawie warunków technicznych jakim powinny odpowiadać budynki i ich usytuowanie, (tekst jednolity) Dz. U. Nr 15, 1999 poz. 140.
- Rubik M., Nowicki J., Chmielowski A. Furtak L., Pykacz S., "Centralne ogrzewanie, wentylacja, ciepła i zimna woda, instalacje gazowe w budynkach jednorodzinnych". Poradnik. Ośrodek Informacji "Technika instalacyjna w budownictwie".
- Skowroński A.: Kłopoty z termomodernizacją. Węlna monopolka. Gazeta Wyborcza 20.02.2000.
- The Master Plan Study for Energy Conservation in the Republic of Poland, 1999.
- Węglarz A, Żmijewski K.: Ocena istniejących zasobów budowlanych i perspektywy termomodernizacji budynków, Morąg 1999.
- Wielgo M.: Dogrzejemy? Program termomodernizacyjny. Gazeta Wyborcza 30.11.1999.
- Zasady udzielania premii termomodernizacyjnej. Bank Gospodarstwa Krajowego.

#### Polish Acts

- PN-B-02025:1999 Obliczanie sezonowego zapotrzebowania na ciepło do ogrzewania budynków mieszkalnych i użyteczności publicznej. (1999)
- PN-94/B-03406 Obliczanie zapotrzebowania na ciepło pomieszczeń o kubaturze do 600 m<sup>3</sup>, (1994).
- PN-83/B-03430/Az3:2000 "Wentylacja w budynkach mieszkalnych zamieszkania zbiorowego i użyteczności publicznej. Wymagania",
- Dz. U. 162, poz. 1121 z dnia 18.12.1998 "Ustawa O Wspieraniu Przedsięwzięć Termomodernizacyjnych"
- Dz. U. 76, poz. 808 z dnia 21.06.2001. "Nowelizacja Ustawy O Wspieraniu Przedsięwzięć Termomodernizacyjnych"
- Dz. U. 12, poz. 114 i 115 z dnia 15.02.2002. Decrees for "Nowelizacja Ustawy O Wspieraniu Przedsięwzięć Termomodernizacyjnych"

#### Web-sites

- <http://www.kape.gov.pl>
- <http://www.abc.com.pl/serwis/du/1999/0459.htm>
- <http://www.nape.pl>
- <http://www.bgk.com.pl>